

RHODE ISLAND'S CRUCIAL LINKS:

The Current Condition and Funding of The State's Roads and Bridges

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Founded in 1971, TRIP® of Washington, DC is a nonprofit organization that researches, evaluates and distributes economic and technical data on highway transportation issues. TRIP is sponsored by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway engineering, construction and finance; labor unions; and organizations concerned with an efficient and safe highway transportation network.

Executive Summary

Rhode Island's extensive system of roads and bridges provides the state's residents and visitors with a high level of mobility. As the backbone of Rhode Island's surface transportation system, roads and bridges play a central role in the state's economy. Rhode Island's extensive highway transportation system enables the state's residents and visitors to go to work, visit family and friends, move goods to market, and frequent tourist attractions.

However, the condition of the state's roads and bridges is deteriorating and likely to worsen over time given current funding constraints. Rhode Island currently faces a significant transportation funding shortfall that could lead to an increasingly deteriorated and congested transportation system in the future if additional funding is not secured.

It is critical that Rhode Island accelerates its efforts to develop and maintain a modern transportation system that can accommodate future growth in population, vehicle travel, tourism and economic development. Improving and maintaining the condition of the state's roads and bridges, as well as modernizing Rhode Island's key highways, is critical to providing the state's residents with a high quality of life.

This report looks at the condition of the state's roads and bridges and the unmet funding needs of Rhode Island's surface transportation system. The condition of the state's roads and bridges is not a reflection on the capability of the Rhode Island Department of Transportation to maintain them, but reflects the effects of the state's insufficient highway transportation funding.

Rhode Island faces a total shortfall of nearly \$1.3 billion between 2008 and 2013 in needed transportation funding to significantly improve road, highway and bridge conditions. This shortfall is exacerbated by increasing highway construction material costs.

- The Rhode Island Department of Transportation (RIDOT) estimates that during the six year period from 2008 to 2013, a total of \$2.76 billion is needed to significantly improve road, highway and bridge conditions. However, RIDOT estimates that only \$1.47 billion will be available during this time, leaving a shortfall of nearly \$1.3 billion for needed improvements to the state's transportation system.
- The cost of roadway improvements is escalating because the price of key materials needed for highway and bridge construction has increased rapidly. Over the five-year period from August 2003 to August 2008 the average cost of materials used for highway construction, including asphalt, concrete, steel, lumber and diesel has increased by 75 percent.

The condition of approximately a quarter of major roads in Rhode Island is rated as "failed" or "poor". Roads in need of repair cost the average Rhode Island motorist nearly \$500 each year in extra vehicle operating costs. This report contains lists of the sections of Rhode Island roadways that are most in need of reconstruction or significant rehabilitation.

- Ten percent of Rhode Island's roads were rated in "failed" condition, while an additional 16 percent were rated in "poor" condition.
- Roads in need of repair cost each Rhode Island motorist an average of \$482 annually in extra vehicle operating costs - \$360 million statewide. These costs include accelerated

vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear.

- According to the Rhode Island Department of Transportation, of the 1,100 total miles of state-maintained roadway, 231 miles are currently in need of significant repair or rehabilitation. By 2013, without an increase in transportation funding, RIDOT estimates that 300 miles of roadway will be in need of significant repair or rehabilitation.
- This report contains a list of 25 Rhode Island roads that are in need of resurfacing or more extensive rehabilitation. Also included is a list of the ten roads in need of complete reconstruction. The total cost to repair or reconstruct these roads is nearly \$133 million.

More than half of Rhode Island's bridges show significant deterioration or do not meet current design standards. This includes all bridges that are 20 feet or more in length and are maintained by state, local and federal agencies.

- Twenty-one percent of Rhode Island's bridges were structurally deficient in 2008. A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Structurally deficient bridges may be posted for lower weight or closed to traffic, restricting or redirecting large vehicles, including commercial trucks and emergency services vehicles.
- Twenty-nine percent of Rhode Island's bridges were functionally obsolete in 2007. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.
- According to the Rhode Island Department of Transportation, of the 772 total bridges in the state, 164 bridges are currently in need of significant repairs or replacement. By 2013, RIDOT estimates that 180 bridges will be in need of significant repairs or replacement.

Increases in population and vehicle travel have placed additional stress on the state's highway transportation system.

- Rhode Island's population increased six percent since 1990, reaching over 1 million residents in 2006. The state's population is projected to increase to 1.1 million residents by 2025.
- Travel in Rhode Island increased by 18 percent from 1990 to 2006 – jumping from 7 billion vehicle miles traveled (VMT) in 1990 to 8.3 billion VMT in 2006.
- By 2025, vehicle travel in Rhode Island is projected to increase by 20 percent, to 10 billion vehicle miles of travel.

The efficiency of Rhode Island’s transportation system, particularly its highways, is critical to the health of the state’s economy. Businesses are increasingly reliant on an efficient and reliable transportation system to move products and services. A key component in business efficiency and success is the level and ease of access to customers, markets, materials and workers.

- Every year, \$21 billion in goods are shipped annually from sites in Rhode Island and another \$18 billion in goods are shipped annually to sites in Rhode Island, mostly by truck.
- Sixty-nine percent of the goods shipped annually from sites in Rhode Island are carried by trucks and another 24 percent are carried by courier services, which use trucks for part of the deliveries. Similarly, 77 percent of the goods shipped to sites in Rhode Island are carried by trucks and another 13 percent are carried by courier services, which use trucks for part of their deliveries.
- Commercial trucking in Rhode Island is projected to increase 38 percent by 2020.
- Businesses have responded to improved communications and greater competition by moving from a push-style distribution system, which relies on low-cost movement of bulk commodities and large-scale warehousing, to a pull-style distribution system, which relies on smaller, more strategic and time-sensitive movement of goods.
- Increasingly, companies are looking at the quality of a region’s transportation system when deciding where to relocate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient transportation system.

Sources of information for this study include the U.S. Department of Transportation, the Rhode Island Department of Transportation (RIDOT), the Federal Highway Administration (FHWA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), AAA, the Bureau of Transportation Statistics (BTS), and the Texas Transportation Institute (TTI).

Introduction

Rhode Island's system of roads, highways and bridges is the most critical transportation link for the state's residents and visitors, providing access to homes, employment, shopping and recreation. Today, with population and travel continuing to increase in the Ocean State, the continued maintenance and improvement of Rhode Island's roads, highways and bridges is crucial to providing a safer, more efficient transportation system, while improving the economic livelihood of the state and accommodating future growth. Improved roads, highways and bridges would provide Rhode Island's residents with greater mobility and traffic safety, which would improve personal and commercial productivity and boost tourism and economic development statewide.

However, despite the need for significant improvements to Rhode Island's system of roads, highways and bridges, the state is unable to undertake many needed projects due to a lack of transportation funding. This funding shortfall is exacerbated by increasing highway construction material costs. The condition of the state's roads and bridges is not a reflection on the capability of the Rhode Island Department of Transportation to maintain them, but reflects the effects of the state's insufficient highway transportation funding.

This report examines the condition, use and funding of Rhode Island's roads and bridges, as well as the state's ability to meet future mobility and funding needs. Sources of information for this study include the U.S. Department of Transportation, the Rhode Island Department of Transportation (RIDOT), the Federal Highway Administration (FHWA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), AAA, the Bureau of Transportation Statistics (BTS), and the Texas Transportation Institute (TTI).

Population and Travel Trends in Rhode Island

Continued growth in the state's population and a significant increase in the miles traveled by the state's residents and visitors have created growing demand on Rhode Island's key highways and roads. It is critical that Rhode Island provide and maintain a transportation system that can accommodate future growth in population, tourism, vehicle travel and economic development.

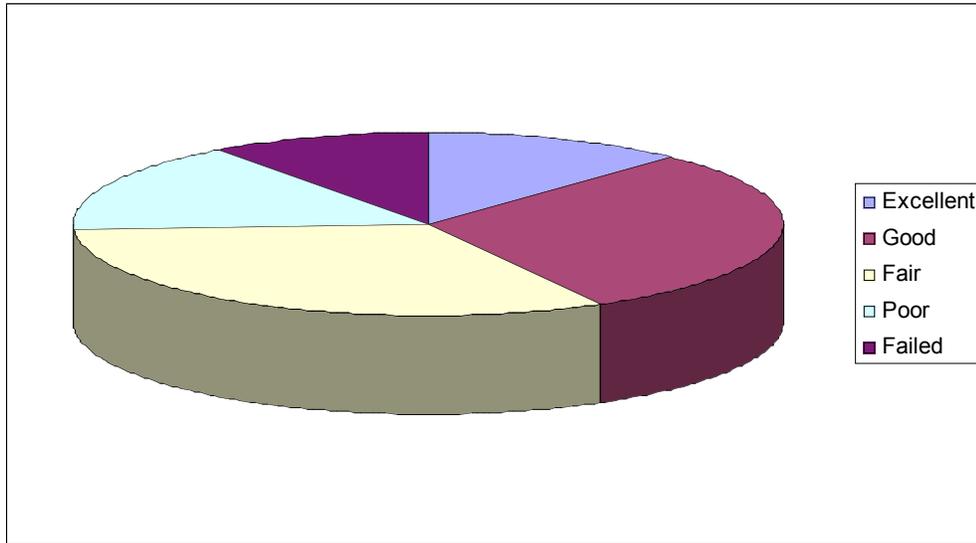
Rhode Island's population increased six percent since 1990, reaching over 1 million residents in 2006.¹ The state's population is projected to increase to 1.1 million residents by 2025.²

From 1990 to 2006, annual vehicle miles of travel in Rhode Island increased by 18 percent, to 8.3 billion miles of travel.³ Based on population and other lifestyle trends, TRIP estimates that travel on Rhode Island's roads and highways will increase 20 percent by 2025, to 10 billion vehicle miles of travel.⁴

Rhode Island Road Conditions

According to the Rhode Island Department of Transportation, ten percent of the state's pavements are in "failed" condition, while an additional 16 percent are rated in "poor" condition, providing motorists with a rough ride. RIDOT estimates that 32 percent of roads are in "fair" condition, 30 percent are in "good" condition, and 12 percent are rated in "excellent" condition.⁵

Chart 1: Rhode Island Pavement Conditions.



Source: Rhode Island Department of Transportation

The life cycle of Rhode Island's roads is greatly affected by the state's ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible. Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road surfaces at intersections are even more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.⁶

According to the Rhode Island Department of Transportation, of the 1,100 total miles of state-maintained roadway, 231 miles are currently in need of significant repairs or rehabilitation. By 2013, without additional transportation funding, RIDOT estimates that 300 miles of roadway will be in need of significant repairs or rehabilitation.⁷

RIDOT has provided a list of the 25 segments of paved roads or highways in the state that are deteriorated and in need of resurfacing or more extensive rehabilitation. Work needed on these roads includes resurfacing, rebuilding sidewalks, striping and improvements to signs and signals. This list is limited to sections of roadway that carry at least 2,500 average daily traffic (ADT). The total cost to resurface or rehabilitate these roads is more than \$65 million.

Chart 2. Twenty-five segments of roadway in need of resurfacing or extensive rehabilitation.

	Route Name	County or Closest City	From	To	Length (Mi.)	ADT	Estimated Cost
1	West Main Rd (Rt 114)	Middletown/Portsmouth	Coddington Hwy	John Kesson Lane	2.3	31,100	\$3,800,000
2	Route 146	Lincoln	Route 116	S. of Sherman Ave. /Wilbur Ave.	2.0	42,600	\$5,400,000
3	Nate Whipple Hwy.	Cumberland	Route 122	MA S/L	4.3	5,700	\$4,500,000
4	Main Rd (Rt 138)	Tiverton	Souza Rd	MA S/L	2.5	9,000	\$2,000,000
5	Elmwood Ave	Providence	Harbor Jct. Bridge 131	Trinity Square - BRd Street	1.8	18,000	\$5,000,000
6	Route 91	Westerly	Route 3	Route 78	1.4	13,100	\$2,300,000
7	Route 216	Richmond	Route 3	Route 91	2.2	9,300	\$1,700,000
8	Reservoir Ave.	Cranston	Park Ave	New London Ave	1.9	27,000	\$2,501,000
9	Route 44	Smithfield	West Greenville Rd	Austin Ave	1.2	15,000	\$2,100,000
10	Route 246	Lincoln	Breakneck Hill Rd	Route 146	2.4	4,500	\$835,000
11	Ocean Rd	Narragansett	South Pier Rd	Old Ocean Rd	3.2	5,800	\$1,500,000
12	Route 138	Richmond	Route 112	I-95	2.0	20,200	\$1,000,000
13	Post Rd	Warwick	South Atlantic Ave	Warwick Ave	0.6	10,000	\$1,001,000
14	Route 107	Burrillville	Route 100	400' West of Union Ave	1.0	6,800	\$1,100,000
15	Route 44	Glocester	Tourtelotte Hill Rd	State Maintenance Facility	2.0	13,600	\$2,000,000
16	Route 116	Lincoln	Route 146	Mendon Rd - Route 122	2.0	13,700	\$3,000,000
17	Route 102	Scituate/Foster	Hartford Pike (Rt 101)	Old Plainfield Pike	8.7	3,000	\$2,000,000
18	Route 165	Exeter	Route 3	CT S/L	7.1	4,000	\$5,000,000
19	Taunton Ave. (Rt 44)	East Providence	Pawtucket Ave	MA S/L	0.4	18,600	\$2,000,000
20	Route 2	North Kingstown	Route 102	Route 4	2.1	11,300	\$1,250,000
21	Diamond Hill Rd (Rt 114)	Woonsocket	Social Street	Bound Rd	2.2	10,600	\$3,600,000
22	Elm St./Beach St.	Westerly	State St/Main St	BRd Street/Route 1	1.0	15,000	\$1,500,000
23	Route 1	South Kingstown	Route 108	Route 110	6.0	17,000	\$3,375,000
24	Smith St. (Rt 44)	Providence	I-95	Lyndhurst Ave	1.5	11,500	\$1,625,000
25	Route 99	Lincoln, Cumberland, Woonsocket	Route 146	Mendon Rd - Route 122	3.3	29,300	\$5,000,000
						TOTAL:	\$65,087,000

Source: Rhode Island Department of Transportation response to TRIP survey.

The Rhode Island Department of Transportation also identified the ten roadways that are most in need of complete or significant reconstruction due to deterioration. The total cost to reconstruct these roads is nearly \$68 million. This list is also limited to roads that carry at least 2,500 vehicles each day.

Chart 3: Ten roads most in need of complete reconstruction.

	Route Name	County or City	From	To	Length (Mi)	ADT	Cost
1	Tiogou Ave (Rt 3)	Coventry	S Main St	Sandy Bottom Rd	0.8	20,300	\$2,800,000
2	Kingston Rd (Rt 138)	S Kingstown	Route 2	Route 108	3.2	13,100	\$15,000,000
3	Route 44	Smithfield	W Greenville Rd	Austin Ave	1.2	15,000	\$10,000,000
4	East Main Rd	Portsmouth	Turnpike Ave	Middle Rd	1.0	24,600	\$12,000,000
5	Post Rd	N Kingstown	Frenchtown Rd	School Street	1.0	20,500	\$8,000,000
6	Hartford Ave	Johnston	I-295	Atwood Ave	0.7	16,400	\$3,500,000
7	Greenwich Ave (Rt 5)	Warwick	Mayfield Ave	I-95	1.0	20,000	\$5,000,000
8	Route 146	N Smithfield	Reservoir Rd	Route 146A	2.0	35,000	\$6,250,000
9	Main St (Rt 115)	Scituate	Route 116	Jackson Flat Rd.	0.3	6,000	\$2,000,000
10	Route 138	Richmond	Route 112	I-95	2.0	20,200	\$3,000,000
						TOTAL:	\$67,550,000

Source: Rhode Island Department of Transportation response to TRIP survey.

The Costs to Motorists of Roads in Inadequate Condition

TRIP has calculated the additional cost to motorists of driving on roads in poor or unacceptable condition. When roads are deteriorated, which may include potholes, rutting or rough surfaces, the cost to operate and maintain a vehicle increases. These additional vehicle operating costs include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear. TRIP estimates that additional vehicle operating costs borne by Rhode Island motorists as a result of poor road conditions is \$360 million annually, or \$482 per motorist.

Additional vehicle operating costs have been calculated in the Highway Development and Management Model (HDM), which is recognized by the U.S. Department of Transportation and more than 100 other countries as the definitive analysis of the impact of road conditions on vehicle operating costs. The HDM report is based on numerous studies that have measured the impact of various factors, including road conditions, on vehicle operating costs.⁸

The HDM study found that road deterioration increases ownership, repair, fuel and tire costs. The report found that deteriorated roads accelerate the pace of depreciation of vehicles and the need for repairs because the stress on the vehicle increases in proportion to the level of

roughness of the pavement surface. Similarly, tire wear and fuel consumption increase as roads deteriorate since there is less efficient transfer of power to the drive train and additional friction between the road and the tires.

TRIP's additional vehicle operating cost estimate is based on taking the average number of miles driven annually by a region's driver, calculating current vehicle operating costs based on AAA's 2007 vehicle operating costs and then using the HDM model to estimate the additional vehicle operating costs paid by drivers as a result of substandard roads.⁹ Additional research on the impact of road conditions on fuel consumption by the Texas Transportation Institute (TTI) is also factored into TRIP's vehicle operating cost methodology.

Bridge Conditions in Rhode Island

Rhode Island's bridges form key links in the state's highway system, providing communities and individuals access to employment, schools, shopping and medical facilities, and facilitating commerce and access for emergency vehicles. However, bridge deficiencies threaten to impede mobility and commerce in the state.

In 2008, approximately half of Rhode Island's bridges (20 feet or longer) were rated as structurally deficient or functionally obsolete. Twenty-one percent of the state's bridges (20 feet or longer) were rated structurally deficient, and an additional 29 percent were rated functionally obsolete.¹⁰

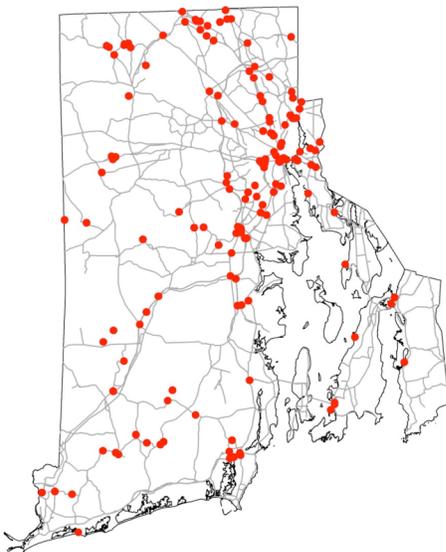
A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Bridges that are structurally deficient may be posted for lower weight limits or closed if their condition warrants such action.

Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.

Deteriorated bridges can have a significant impact on daily life. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid posted bridges. Redirected trips also lengthen travel time, waste fuel and reduce the efficiency of the local economy.

According to the Rhode Island Department of Transportation, of the 772 total bridges in the state, 164 bridges are currently in need of significant repairs or replacement. By 2013, RIDOT estimates that 180 bridges will be in need of significant repairs or replacement.¹¹

Chart 4: Location of 164 deficient bridges in Rhode Island.



Source: Rhode Island Department of Transportation

Importance of Transportation to Economic Growth

Maintaining and improving Rhode Island's surface transportation system is critical to the state's economic well being. As a major industrial and tourism center, it is critical to Rhode Island's economy that the state's transportation system is efficient and well maintained.

In addition to Rhode Island's location along Interstate 95, which allows access to regional, national and international markets, the major shipping ports in Narragansett Bay contain more than 10 miles of commercial waterfront with piers and wharves to accommodate deep and medium draft vessels. Rhode Island's economy is also heavily reliant on tourism and hospitality, which is the state's second largest industry, supporting more than 63,000 jobs and \$5 billion in spending in 2006.¹²

The new culture of business demands that an area have well-maintained and efficient roads, highways and bridges if it is to remain economically competitive. The advent of modern national and global communications and the impact of free trade in North America and elsewhere have resulted in a significant increase in freight movement. Consequently, the quality of a region's transportation system has become a key component in a business's ability to compete locally, nationally and internationally.

Businesses have responded to improved communications and the greater necessity to cut costs with a variety of innovations including just-in-time delivery, increased small package delivery, demand-side inventory management and by accepting customer orders through the Internet. The result of these changes has been a significant improvement in logistics efficiency as firms move away from a push-style distribution system, which relies on large-scale warehousing of materials, to a pull-style distribution system, which relies on smaller, more strategic

movement of goods. These improvements have made mobile inventories the norm, resulting in the nation's trucks literally becoming rolling warehouses.

Highways are vitally important to continued economic development in Rhode Island. As the economy expands, creating more jobs and increasing consumer confidence, the demand for consumer and business products grows. In turn, manufacturers ship greater quantities of goods to market to meet this demand, a process that adds to truck traffic on the state's highways and major arterial roads.

Every year, \$21 billion in goods are shipped from sites in Rhode Island and another \$18 billion in goods are shipped to sites in Rhode Island, mostly by trucks.¹³ Sixty-nine percent of the goods shipped annually from sites in Rhode Island are carried by trucks and another 24 percent are carried by courier services, which use trucks for part of their deliveries. Similarly, 77 percent of the goods shipped to sites in Rhode Island are carried by trucks and another 13 percent are carried by courier services, which use trucks for part of their deliveries.¹⁴

Trucking is a crucial part of Rhode Island's economy, as commercial trucks move goods from sites across the state to markets inside and outside the state. Commercial truck travel in Rhode Island is expected to increase significantly over the next two decades. Based on federal projections, TRIP estimates that commercial trucking will increase by 38 percent in Rhode Island by the year 2020.¹⁵

Highway Funding in Rhode Island

Rhode Island lacks adequate funding to complete needed road and bridge repairs and improvements. This shortfall is exacerbated by increasing highway construction material costs.

The Rhode Island Department of Transportation estimates that from 2008 to 2013, a total of \$2.76 billion is needed to significantly improve road, highway and bridge conditions.

However, RIDOT estimates that less than \$1.5 billion will be available during that time, leaving a shortfall of nearly \$1.3 billion for needed improvements to the state's transportation system.¹⁶

The following chart details the available funding and the funding levels required to make needed bridge repairs, maintain and improve road conditions, relieve congestion and implement needed safety enhancements.

Chart 5. Rhode Island's transportation funding shortfall from 2008 to 2013

	Amount Needed	Amount Available
2008	\$460 Million	\$220 Million
2009	\$460 Million	\$230 Million
2010	\$460 Million	\$240 Million
2011	\$460 Million	\$250 Million
2012	\$460 Million	\$260 Million
2013	\$460 Million	\$270 Million
TOTAL	\$2.76 Billion	\$1.47 Billion

Source: Rhode Island Department of Transportation

Further exacerbating the state's existing funding shortfall is the fact that the cost of roadway improvements is escalating because the price of key materials needed for highway and bridge construction has increased rapidly. From August 2003 to August 2008, the average cost of materials used for highway construction, including asphalt, concrete, steel and diesel has increased by 75 percent.¹⁷

Conclusion

Rhode Island's extensive system of roads and bridges provides its residents and visitors with a high level of mobility. As the backbone of the Ocean State's transportation system, roads and bridges play a central role in the state's economy.

A well-maintained, safe and free-flowing highway system in Rhode Island is critical to the state's ability to accommodate future growth safely and efficiently as the state's population and vehicle travel increase. Increased highway funding would permit Rhode Island DOT to improve road and bridge conditions, mobility and traffic safety statewide, boosting the quality of life for residents, businesses and visitors.

Endnotes

¹ U.S. Census Bureau. www.census.gov.

² Ibid.

³ U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2006. www.fhwa.dot.gov.

⁴ TRIP estimate based on FHWA data.

⁵ RIDOT response to TRIP survey.

⁶ Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.

⁷ RIDOT response to TRIP survey.

⁸ Highway Development and Management: Volume Seven. Modeling Road User and Environmental Effects in HDM-4. Bennett, C. and Greenwood, I. 2000.

⁹ Your Driving Costs. AAA. 2006.

¹⁰ Rhode Island Department of Transportation.

¹¹ RIDOT response to TRIP survey.

¹² Rhode Island Economic Development Corporation. www.riedc.com.

¹³ Bureau of Transportation Statistics, U.S. Department of Transportation. 2002 Commodity Flow Survey, State Summaries.

¹⁴ Ibid.

¹⁵ U.S. Department of Transportation: Office of Freight Management and Operations. www.fhwa.dot.gov.

¹⁶ Rhode Island DOT response to TRIP survey.

¹⁷ Bureau of Labor Statistics, index of highway and street construction materials cost, April 2003 to April 2008.